GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU

Accredited by NAAC with A^{++} Grade

GITAM School of Science

CURRICULUM AND SYLLABUS

2 Year Postgraduate Programme
PPHYS01: M.Sc. Electronics

w.e.f. 2025-26 admitted batch

(Updated on July 2025)

Academic Regulations

Applicable for the Postgraduate Programmes in the Schools of Humanities & Social Sciences and Science (except M.C.A)

https://www.gitam.edu/academics/academic-regulations

GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Vision

GITAM will be an exceptional knowledge-driven institution advancing on a culture of honesty and compassion to make a difference to the world.

Mission

- Build a dynamic application-oriented education ecosystem immersed in holistic development.
- Nurture valuable futures with global perspectives for our students by helping them find their ikigai.
- Drive impactful integrated research programmes to generate new knowledge, guided by integrity, collaboration, and entrepreneurial spirit.
- Permeate a culture of kindness within GITAM, fostering passionate contributors.

Quality Policy

To achieve global standards and excellence in teaching, research, and consultancy by creating an environment in which the faculty and students share a passion for creating, sharing and applying knowledge to continuously improve the quality of education.

GITAM School of Science

Vision

Nurturing a high-quality Science Education and Research by providing a best learning ecosystem to create world class academicians and researchers.

Mission

- To teach the most renewed curriculum that lay the foundation for students to start exciting careers in academia, research, and industry.
- To foster an environment of healthy curiosity, an innovative mindset, and a strong desire to contribute to the science world.
- To advance our understandings of the natural processes of Physical, Chemical and Biological systems for a better habitable world.
- To inculcate a strong sense of empathy, integrity, and trust in the GITAM Fraternity with a strong commitment towards society and environment.

VISION AND MISSION OF THE DEPARTMENT

VISION

To provide high-quality education and research in the physics by nurturing an immersive and enjoyable blended learning environment and evolving into a centre of product-based research with an industrial partnership.

MISSION

- An interdisciplinary curriculum to teach students to solve complicated challenges and innovate to meet social demands, from technology to sustainability.
- Foster a dynamic academic environment that promotes curiosity, critical thinking, and application-oriented learning in physics so students can excel in their careers.
- Translate material science, quantum technologies, and IoT research findings into commercialized novel products.
- Inculcate a culture of honesty, compassion, and kindness, motivating students to make meaningful contributions to society.

Programme Educational Objectives (PEOs)

PEO 1: Provide a deep understanding of advanced electronic concepts to foster excellence in diverse career paths within electronics and related industries.

PEO 2: Make use of acquired knowledge and skills to tackle real-world challenges, contributing to technological advancements and societal benefits.

PEO 3: Instil strong communication, leadership, and teamwork abilities for effective collaboration and the ability to take on leadership roles.

PEO 4: Provide guidance to uphold ethical values, integrity, and a commitment to lifelong learning, ensuring continuous personal and professional growth and making a positive impact on society.

PEO Articulation

	PEO1	PEO2	PEO3	PEO4
M1	3	3	2	2
M2	3	3	2	2
M3	3	3	2	2
M4	2	2	3	3

3 - High Correlation, 2 - Medium Correlation, 1 - Low Correlation

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

At the end of the Programme the students would be able to demonstrate:

PO1: The graduates should be able to demonstrate the acquisition of:

- Advanced knowledge about a specialized field of enquiry with a critical understanding of the emerging developments and issues relating to one or more fields of learning.
- Advanced knowledge and understanding of the research principles, methods, and techniques applicable to the chosen field(s) of learning or professional practice.
- Procedural knowledge required for performing and accomplishing complex and specialized and professional tasks relating to teaching, and research and development.

PO2: The graduates should be able to demonstrate the acquisition of:

- Advanced cognitive and technical skills required for performing and accomplishing complex tasks related to the chosen fields of learning.
- Advanced cognitive and technical skills required for evaluating research findings and designing and conducting relevant research that contributes to the generation of new knowledge.
- Specialized cognitive and technical skills relating to a body of knowledge and practice to analyze and synthesize complex information and problems.

PO3: The graduates should be able to demonstrate the ability to:

- Apply the acquired advanced theoretical and/or technical knowledge about a specialized field of enquiry or professional practice and a range of cognitive and practical skills to identify and analyze problems and issues, including real-life problems, associated with the chosen fields of learning.
- Apply advanced knowledge relating to research methods to carry out research and investigations to formulate evidence-based solutions to complex and unpredictable problems.

PO4: The graduates should be able to demonstrate the ability to:

- Listen carefully, read texts and research papers analytically and present complex information in a clear and concise manner to different groups/audiences.
- Communicate, in a well-structured manner, technical information and explanations, and the findings/results of the research studies undertaken in the chosen field of study.
- Present in a concise manner view on the relevance and applications of the findings of recent research and evaluation studies in the context of emerging developments and issues.
- Meet one's own learning needs relating to the chosen fields of learning, work/vocation, and an area of professional practice.
- Pursue self-paced and self-directed learning to upgrade knowledge and skills, including research-related skills, required to pursue a higher level of education and research.
- Problematize, synthesize, and articulate issues and design research proposals.
- Define problems, formulate appropriate and relevant research questions, formulate hypotheses, test hypotheses using quantitative and qualitative data, establish hypotheses, make inferences based on the analysis and interpretation of data, and

predict cause-and-effect relationships.

- Develop appropriate tools for data collection for research.
- Use appropriate statistical and other analytical tools and techniques for the analysis of data collected for research and evaluation studies.
- Plan, execute, and report the results of an investigation.
- Follow basic research ethics and skills in practicing/doing ethics in the field/ in one's own research work.
- Make judgements and take decisions regarding the adoption of approaches to solving problems, including real-life problems, based on the analysis and evaluation of information and empirical evidence collected.
- Make judgement across a range of functions requiring the exercise of full responsibility and accountability for personal and/or group actions to generate solutions to specific problems associated with the chosen fields/subfields of study, work, or professional practice.

PO5: The graduates should be able to demonstrate the willingness and ability to:

- Embrace and practice constitutional, humanistic, ethical, and moral values in one's life.
- Adopt objective and unbiased actions in all aspects of work related to the chosen fields/subfields of study and professional practice.
- Participate in actions to address environmental protection and sustainable development issues.
- Support relevant ethical and moral issues by formulating and presenting coherent arguments.
- Follow ethical principles and practices in all aspects of research and unethical practices such as fabrication, falsification or misrepresentation of data or committing plagiarism.

PO6: The graduates should be able to demonstrate the acquisition of knowledge and skill sets required for:

- Adapting to the future of work and responding to the demands of the fast pace of technological developments and innovations that drive the shift in employers' demands for skills, particularly with respect to t h e transition towards more technology-assisted work involving the creation of new forms of work and rapidly changing work and production processes.
- Exercising full personal responsibility for the output of own work as well as for group/team outputs and for managing work that is complex and unpredictable requiring new strategic approaches.

PSO1: Learn and comprehensively understand advanced electronic theories, principles, and methodologies to drive expertise in the field.

PSO2: Cultivate analytical and problem-solving skills to design, analyze, and optimize electronic circuits and systems.

PSO3: Foster independent and collaborative research capabilities to generate new knowledge and innovations in electronics.

Curriculum Structure

(Flexible Credit System)

Minimum Credit Requirements to Award Degree Under Each Category

Duration & Name of the Programme				S.No	Course Category		Minimum Credit Requirement		
Programme	Eligibility	Programme	Eligibility				2 Year PG (2nd year- Course Work alone)	2 Year PG (2nd year - Course Work and Research)	2 Year PG (2nd year - Research alone)
2-year PG Degree (with exit option at the end of first year)	3-year UG Degree	1 year & PG Diploma	3-year UG Degree	1	Programme Core Courses & Labs	PC	28	28	28
				2	Programme Electives Courses	PE	8	8	8
				3	Research Methodology	FC	4	4	4
				4	Seminar	FC	1	1	1
				5	Term Paper	FC	1	1	1
				6	Internship	FC	4	4	4
				Total (At the end of I Year)			46	46	46
		1 year & PG Degree	4-year UG Degree	7	Programme Core Courses	PC	40	20	0
				8	Programme Electives Courses	PE			
				9	Research Project	FC	0	20	0
				10	Research Dissertation	FC	0	0	40
				Total (At the end of II Year)			86	86	86

2 Year PG programme:

Semester I and II: Common Structure for Course Work, Course Work & Research and Research Alone

Course Code	Category	Level	Course Title	L	T	P	S	J	C
Semester - I									
25PHYS6151	PC	600	Physics of Electronic Materials	4	0	0	0	0	4
25PHYS6161	PC	600	Mathematical and Computational Methods	4	0	0	0	0	4
25PHYS6171	PC	600	Electronic Measurements and Instrumentation	4	0	0	0	0	4
25PHYS6181	PC	600	Instrumentation Laboratory	0	0	4	0	0	2
25PHYS6191	PC	600	Computational Physics Laboratory (Using MATLAB)	0	0	4	0	0	2
Choose any one of the following electives:									
25PHYS6201	PE	600	Signal Processing techniques	4	0	0	0	0	4
25PHYS6211	PE	600	Biomedical Instrumentation	4	0	0	0	0	4
25PHYS6221	PE	600	Industrial Electronics	4	0	0	0	0	4
			Total Credits						**20**
Semester - II									
25PHYS6231	PC	600	Communication Systems	4	0	0	0	0	4
25PHYS6241	PC	600	Digital Logic Circuits and Microprocessor	4	0	0	0	0	4
25PHYS6251	PC	600	Communication Laboratory	0	0	4	0	0	2
25PHYS6261	PC	600	Microcontroller Interfacing Laboratory	0	0	4	0	0	2
25PHYS6444	FC	600	Research Methodology	4	0	0	0	0	4
25PHYS6777	FC	600	Term Paper	0	0	0	0	2	1
25PHYS6666	FC	600	Seminar	0	0	0	0	2	1
25PHYS6333	FC	600	Internship	0	0	0	0	8	4
Choose any one of the following electives:									
25PHYS6271	PE	600	Radar Systems and Satellite communication	4	0	0	0	0	4
25PHYS6281	PE	600	Microcontroller and Interfacing	4	0	0	0	0	4
25PHYS6291	PE	600	PCB Design and Fabrication	4	0	0	0	0	4
			Total Credits						**26**

2nd Year - Research alone:

Course Code	Category	Level	Course Title	L	T	P	S	J	C
Semester - III									
25PHYS7888	FC	700	Research Dissertation - I	0	0	0	0	40	20
			Total Credits						**20**
Semester – IV									
25PHYS7999	FC	700	Research Dissertation - II	0	0	0	0	40	20
			Total Credits						**20**

2nd Year – 'Course Work alone' & 'Coursework and Research':

Semester – III (Common Structure for 'Course Work alone' & 'Course Work and Research')									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25PHYS7201	PC	700	Photonics: Principles and Applications	4	0	0	0	0	4
25PHYS7211	PC	700	Embedded OS and RTOS	4	0	0	0	0	4
25PHYS7221	PC	700	Photonics Laboratory	0	0	4	0	0	2
25PHYS7231	PC	700	Embedded Laboratory	0	0	4	0	0	2
Choose any two of the following electives:									
25PHYS7241	PE	700	Microelectronic Fabrication	4	0	0	0	0	4
25PHYS7251	PE	700	Material Characterization Techniques	4	0	0	0	0	4
25PHYS7261	PE	700	Advanced Embedded Systems	4	0	0	0	0	4
25PHYS7271	PE	700	Embedded C	4	0	0	0	0	4
25PHYS7281	PE	700	Theory of Microwave devices	4	0	0	0	0	4
25PHYS7291	PE	700	Advanced wireless communication	4	0	0	0	0	4
			Total Credits						**20**

Course Work alone

Semester - IV									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25PHYS7301	PC	700	VLSI Design	4	0	0	0	0	4
25PHYS7311	PC	700	Internet of Things	4	0	0	0	0	4
25PHYS7321	PC	700	VHDL Laboratory	0	0	4	0	0	2
25PHYS7331	PC	700	IoT Laboratory	0	0	4	0	0	2
Choose any two of the following electives:									
25PHYS7341	PE	700	Advanced CMOS Micro fabrication	4	0	0	0	0	4
25PHYS7351	PE	700	Sensors and Actuators	4	0	0	0	0	4
25PHYS7361	PE	700	Machine Learning using python	4	0	0	0	0	4
25PHYS7371	PE	700	Android Application design	4	0	0	0	0	4
25PHYS7381	PE	700	Computer Networks	4	0	0	0	0	4
25PHYS7391	PE	700	Testing Structural Materials using NDT techniques	4	0	0	0	0	4
			Total Credits						**20**

Coursework and Research

Semester – IV									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25PHYS7555	FC	700	Research Project	0	0	0	0	40	20
			Total Credits						**20**

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